The following effects can be obtained from the first embodiment described as above.

(i) Since the entire nozzle body tip portion 3a protrudes in a conical shape from the nozzle body outer peripheral surface 3b covered with the cap 24, no corner portions or recessed portions are formed on a surface thereof. Therefore, heat generated by combustion does not concentrate at a corner portion, or a surface area is not enlarged by a recessed portion, whereby heat generated by combustion does not increase the temperature at the nozzle body tip portion 3a.

Likewise, since the spherical foremost portion 3c is formed such that it does not form a corner portion or recessed portion in the conical peripheral portion 3d, heat generated by combustion increases the temperature of the nozzle body tip portion 3a. This effectively prevents the temperature of the nozzle hole 26 from increasing and deposits from accumulating.

[A second embodiment]

Figs. 3A and 3B show a structure of a tip portion 42a of the fuel injection valve body according to a second embodiment of the invention. Fig. 3A is a front view and Fig. 3B is a longitudinal sectional view. The second embodiment differs from the first embodiment in that a tip portion 54a of a cap 54 is formed with a nozzle body tip portion 43a into a continuous tip portion of a conical shape and the entire continuous tip portion protruding without forming a recessed portion on a surface thereof. Other constructions of the second embodiment are the same as those of the first embodiment, including a foremost portion 43c of the nozzle body tip portion 43a formed into a spherical shape.

The following effects can be obtained from the second embodiment described as above.

(i) The same effects as those described in (i) of the first embodiment can be generated.

(ii) Since the tip portion 54a of the cap 54 is formed with the nozzle body tip portion 43a into a continuous tip portion, it even further prevents heat from concentrating at the tip portion 54a of the cap 54 and the temperature of the nozzle hole 56 from increasing through heat transfer from the cap 54 side. As a result, the effect of preventing accumulation of deposits is even more enhanced.

[A third embodiment]

Figs. 4A and 4B show a structure of a tip portion 62a of the fuel injection valve body according to a third embodiment of the invention. Fig. 4A is a front view and Fig. 4B is a longitudinal sectional view. The third embodiment differs from the first embodiment in that a tip portion 64a of a cap 64 extends along a nozzle body tip portion 63a and covers a part of the nozzle body tip portion 63a through a gap 65. Other constructions of the third embodiment are the same as those of the first embodiment.

The following effects can be obtained from the third embodiment described as above.

(i) The same effects as those described in (i) of the first embodiment can be generated.

(ii) Since a part of the nozzle body tip portion 63a is covered with the tip portion 64a of the cap 64 through the gap 65, a smaller area in the nozzle body tip

portion 63a is exposed to a combustion flame. This prevents the temperature of the nozzle body tip portion 63a from increasing. Even if the temperature of the tip portion 64a of the cap 64 increases, the gap 65 blocks a direct transfer of heat to the nozzle body tip portion 63a, which prevents the temperature of the nozzle body tip portion 63a from increasing. As a result, the temperature of the nozzle hole 66 can be prevented from increasing and accumulation of deposits can be restricted.

[A fourth embodiment]

Figs. 5A and 5B show a structure of a tip portion 72a of the fuel injection valve body according to a fourth embodiment of the invention. Fig. 5A is a front view and Fig. 5B is a longitudinal sectional view. The fifth embodiment differs from the first embodiment in that the entire nozzle body tip portion 73a protrudes in a spherical shape. Namely, it protrudes directly from an outer peripheral surface 73b of the nozzle body 73 in a spherical shape. A nozzle hole 76 is opened near an apex of the nozzle body tip portion 73a. Other constructions of the fourth embodiment are the same as those of the first embodiment.

The following effects can be obtained from the fourth embodiment described as above.

(i) Since the entire nozzle body tip portion 73a protrudes in a spherical shape directly from the outer peripheral surface 73b of the nozzle body 73, a corner portion or a recessed portion cannot be formed on a surface thereof. The same effects as those described in (i) of the first embodiment can therefore be generated.

[A fifth embodiment]